

p:tac

.....

AAATGAGCTG TTGACAATTA ATCATCGGCT CGTATAATGT GTGGAATTGT GAGCGGATAA  
EcoRI SacI KpnISmaI  
CAATTTTACA CAGGAAACAG AATTCGAGCT CGGTACCCGG GCTACATGGA GATTAAGTCA  
RBS |-> α-globin  
ATCTAGAGGG TATTAATAAT GTATCGCTTA AATAAGGAGG AATAACATAT GGTGCTGTCT

CCTGCCGACA AGACCAACGT CAAGGCCGCC TGGGGTAAGG TCGGCGCGCA CGCTGGCGAG  
TATGGTGCGG AGGCCCTGGA GAGGATGTTT CTGTCCTTCC CCACCACCAA GACCTACTTC  
CCGCACTTCG ATCTGAGCCA CGGCTCTGCC CAGGTTAAGG GCCACGGCAA GAAGGTGGCC  
GACGCGCTGA CCAACGCCGT GCGGCACGTG GACGACATGC CCAACGCGCT GTCCGCCCTG  
AGCGACCTGC ACGCGCACAA GCTTCGGGTG GACCCGGTCA ACTTCAAGCT CCTAAGCCAC  
TGCCTGCTGG TGACCCTGGC CGCCACCTC CCCGCCGAGT TCACCCCTGC GGTGCACGCC  
->|  
TCCCTGGACA AGTTCCTGGC TTCTGTGAGC ACCGTGCTGA CCTCCAAATA CCGTTAAACT  
RBS |-> β-globin  
AGAGGGTATT AATAATGTAT CGCTTAAATA AGGAGGAATA ACATATGGTG CACCTGACTC  
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GTGAGGCCCT GGGCAGGCTG CTGGTGGTCT ACCCTTGGAC CCAGAGGTTT TTTGAGTCCT  
TTGGGGATCT GTCCACTCCT GATGCTGTTA TGGGCAACCC TAAGGTGAAG GCTCATGGCA  
AGAAAGTGCT CGGTGCCTTT AGTGATGGCC TGGCTCACCT GGACAACCTC AAGGGCACCT  
TTGCCACACT GAGTGAGCTG CACTGTGACA AGCTGCACGT GGATCCTGAG AACTTCAGGC  
β108Asn->Gln  
TCCTGGGACA AGTACTGGTC TGTGTGCTGG CCCATCACTT TGGCAAAGAA TTCACCCAC  
CAGTGCAGGC TGCCTATCAG AAAGTGGTGG CTGGTGTGGC TAATGCCCTG GCCCACAAAGT  
->|SphI rrB (5S, T1, T2)  
ATCACTAAGC ATGCATCTGT TTTGGCGGAT GAGAGAAGAT TTTAGCCTG ATACAGATTA  
NsiI

.....

p: tac

AAATGAGCTG TTGACAATTA ATCATCGGCT CGTATAATGT GTGGAATTGT GAGCGGATAA  
EcoRI SacI KpnISmaI  
CAATTTTACA CAGGAAACAG AATTCGAGCT CGGTACCCGG GCTACATGGA GATTAAGTCA  
RBS | -> α-globin  
ATCTAGAGGG TATTAATAAT GTATCGCTTA AATAAGGAGG AATAACATAT GGTGCTGTCT  
CCTGCCGACA AGACCAACGT CAAGGCCGCC TGGGGTAAGG TCGGCGCGCA CGCTGGCGAG  
TATGGTGCGG AGGCCCTGGA GAGGATGTTT CTGTCCTTCC CCACCACCAA GACCTACTTC  
CCGCACTTCG ATCTGAGCCA CGGCTCTGCC CAGGTTAAGG GCCACGGCAA GAAGGTGGCC  
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AGCGACCTGC ACGCGCACAA GCTTCGGGTG GACCCGGTCA ACTTCAAGCT CCTAAGCCAC  
TGCCTGCTGG TGACCCTGGC CGCCACCTC CCCGCCGAGT TCACCCTGCT GGTGCACGCC  
->|  
TCCCTGGACA AGTTCTGGC TTCTGTGAGC ACCGTGCTGA CCTCCAAATA CCGTTAAACT  
RBS | -> β-globin  
AGAGGGTATT AATAATGTAT CGCTTAAATA AGGAGGAATA ACATATGGTG CACCTGACTC  
CTGAGGAGAA GTCTGCCGTT ACTGCCCTGT GGGGCAAGGT GAACGTGGAT GAAGTTGGTG  
GTGAGGCCCT GGGCAGGCTG CTGGTGGTCT ACCCTTGGAC CCAGAGGTTT TTTGAGTCCT  
TTGGGGATCT GTCCACTCCT GATGCTGTTA TGGGCAACCC TAAGGTGAAG GTCATGGCA  
AGAAAGTGCT CGGTGCCTTT AGTGATGGCC TGGCTCACCT GGACAACCTC AAGGGCACCT  
TTGCCACACT GAGTGAGCTG CACTGTGACA AGCTGCACGT GGATCCTGAG AACTTCAGGT  
β105Leu->Trp  
GGCTAGGCAA CGTGCTGGTC TGTGTGCTGG CCCATCACTT TGGCAAAGAA TTCACCCAC  
CAGTGCAGGC TGCCTATCAG AAAGTGGTGG CTGGTGTGGC TAATGCCCTG GCCACAAGT  
->| SphI rrB (5S, T1, T2)  
ATCACTAAGC ATGCATCTGT TTTGGCGGAT GAGAGAAGAT TTTCAGCCTG ATACAGATTA  
NsiI

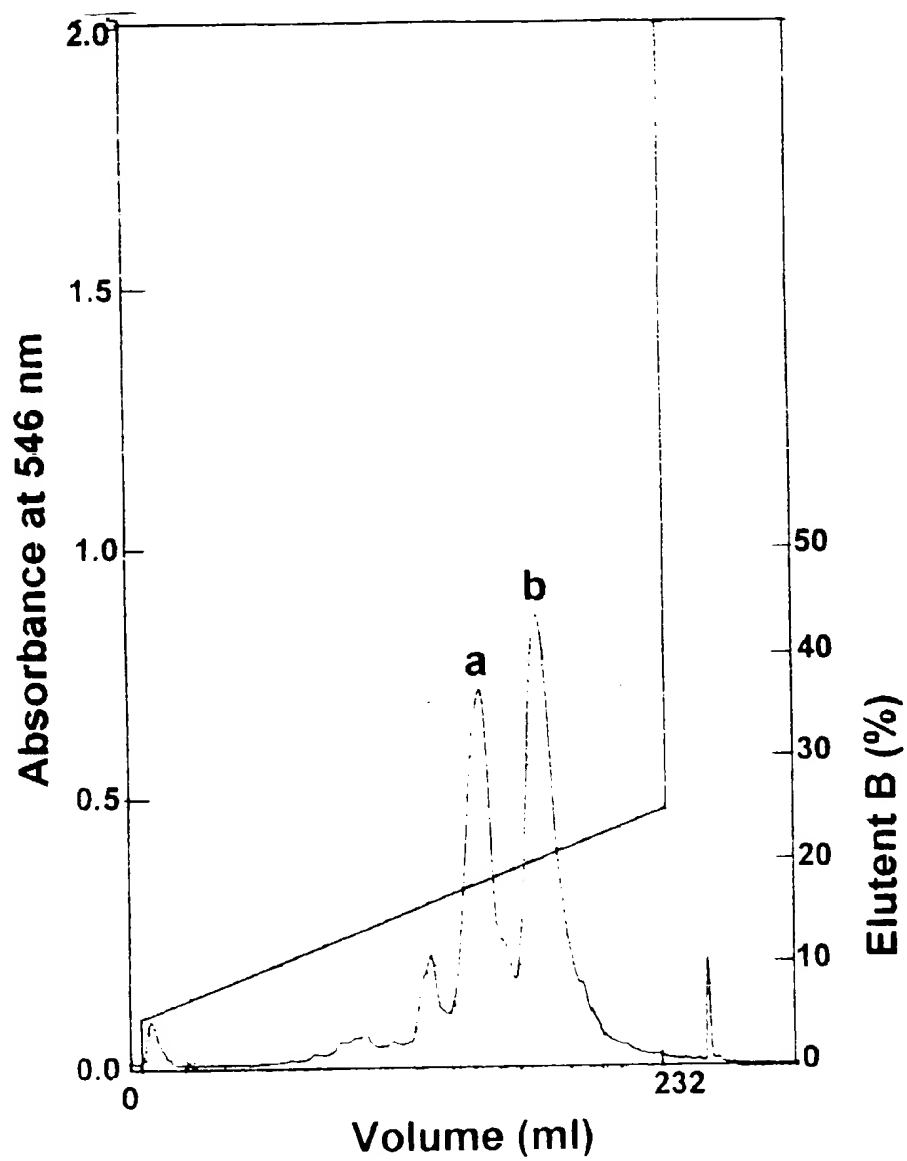


FIG. 2A

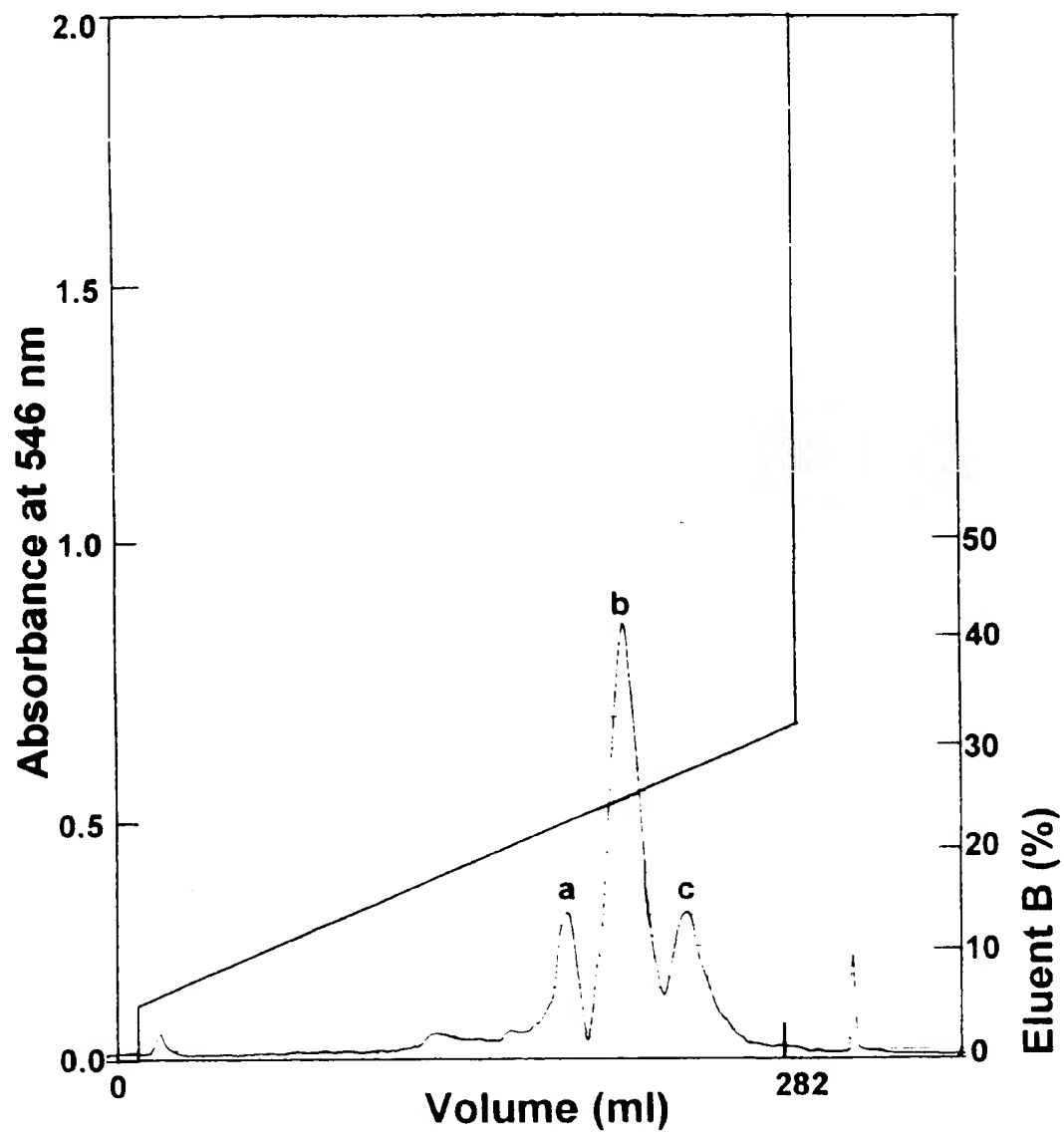


FIG. 2B

FIG. 3A

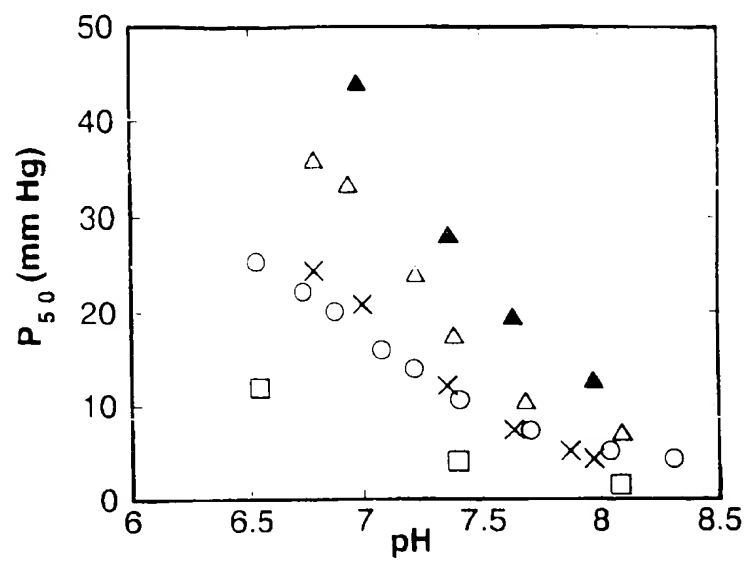
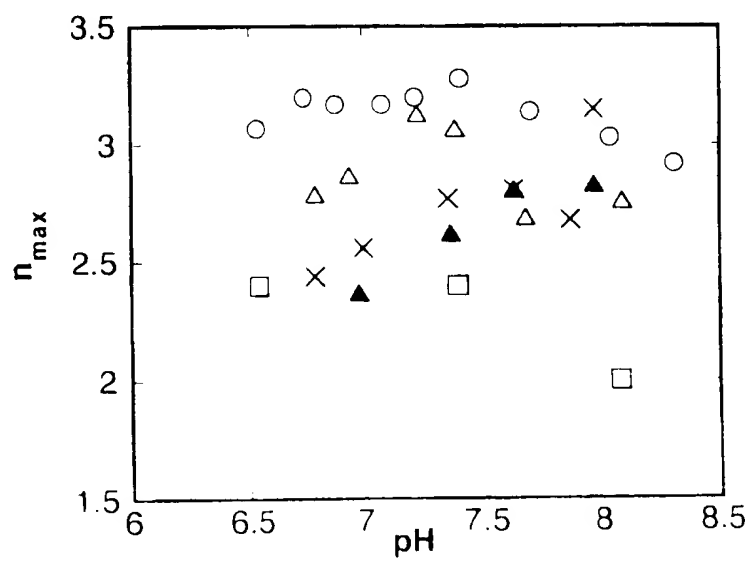


FIG. 3B



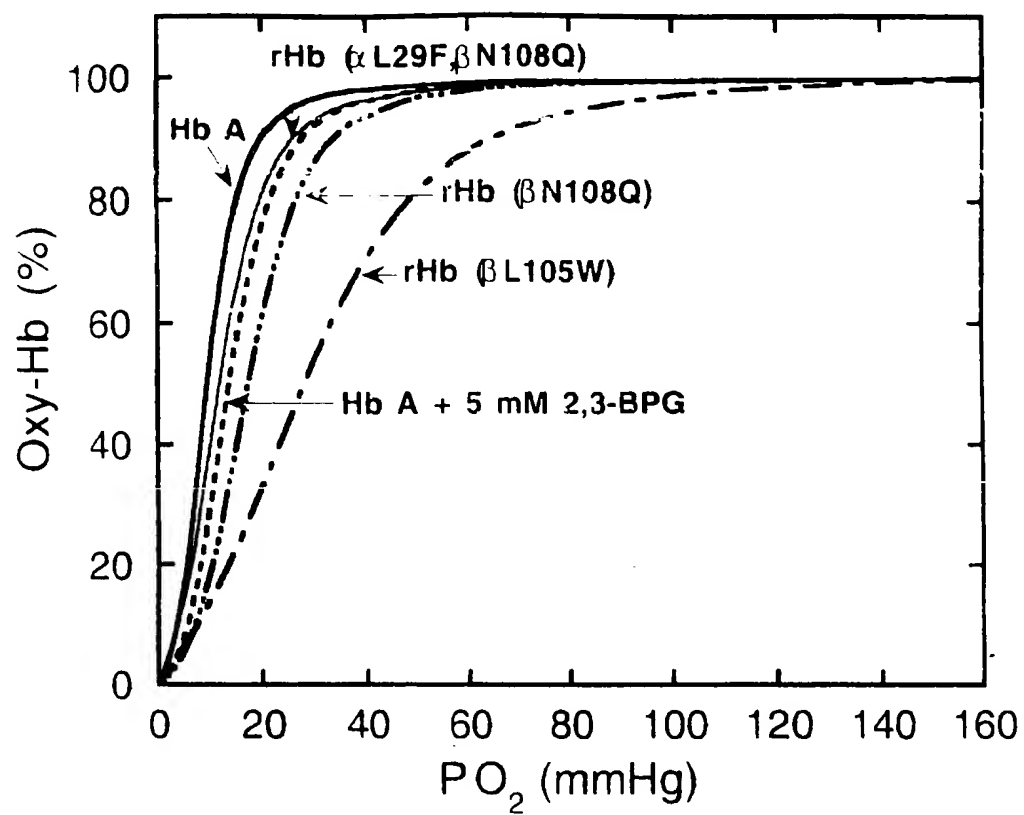


FIG. 4

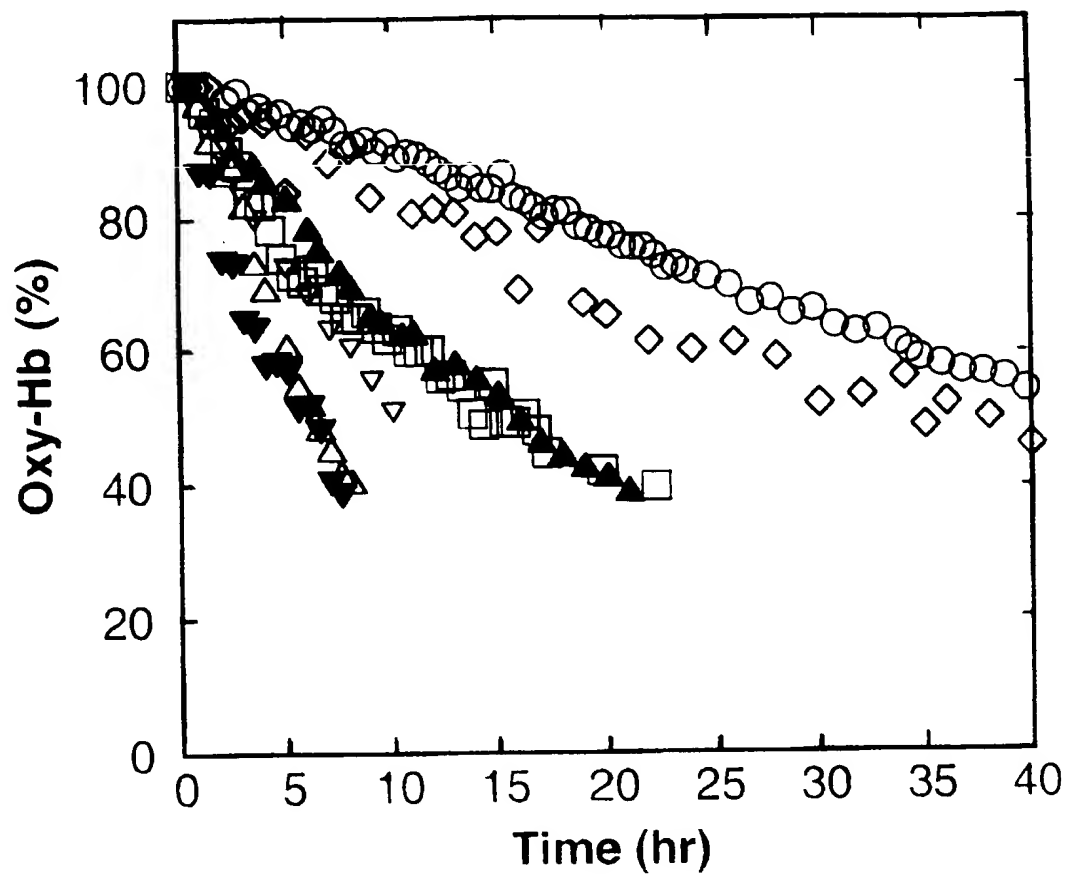
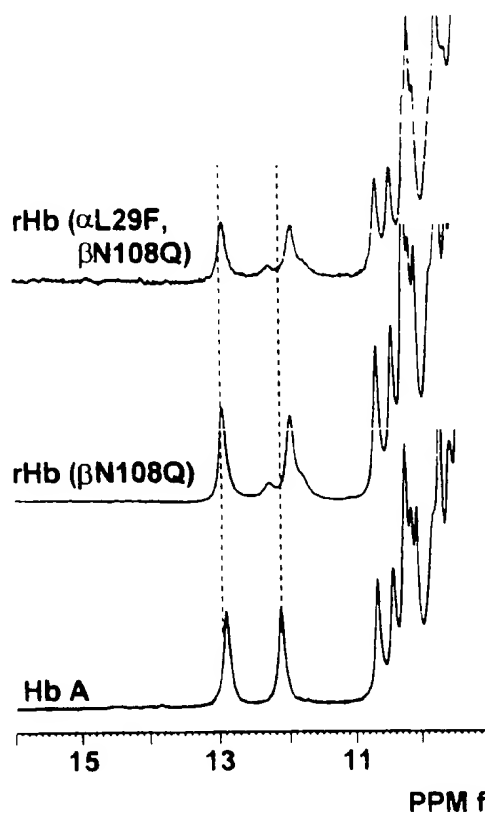
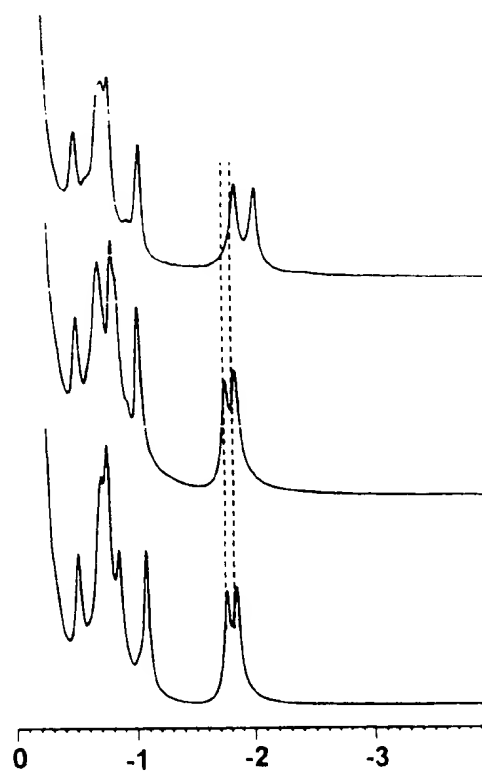


FIG. 5

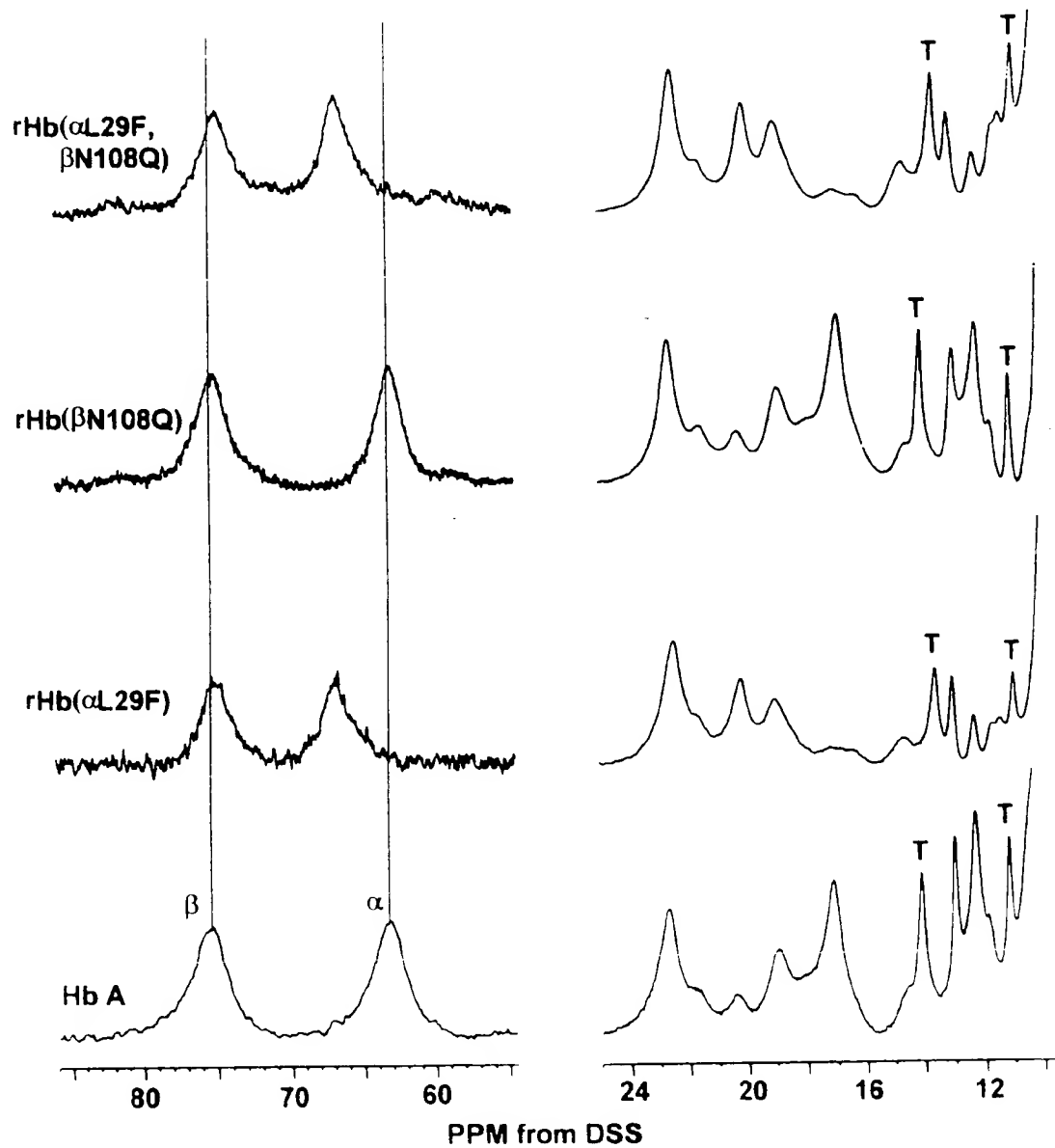


**FIG. 6A**



**FIG. 6B**





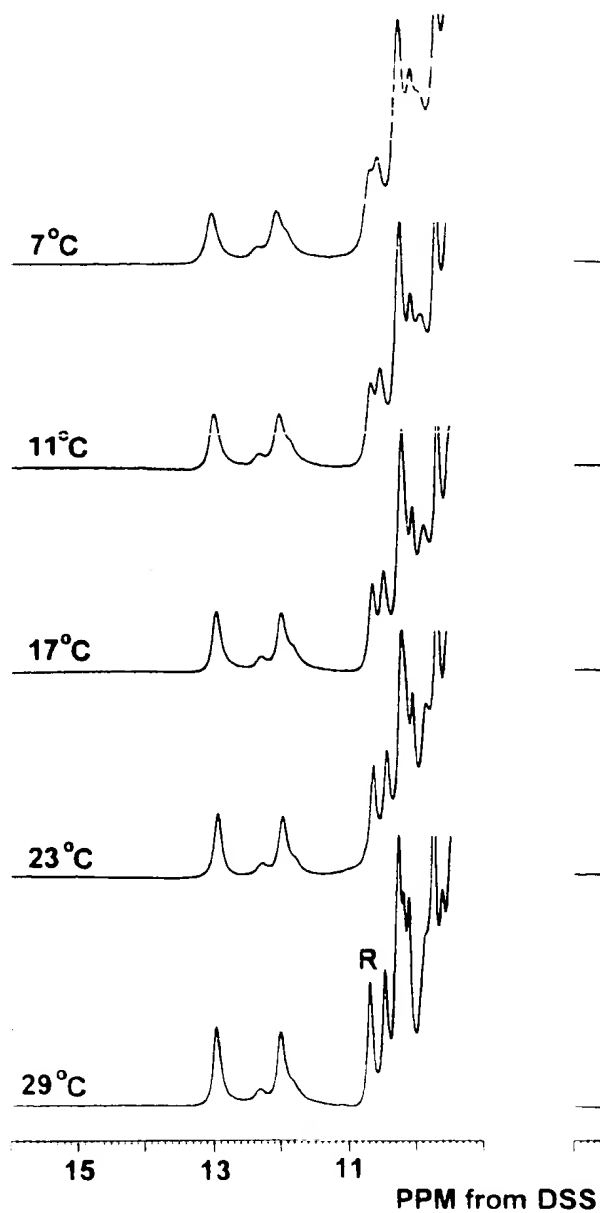


FIG. 8A

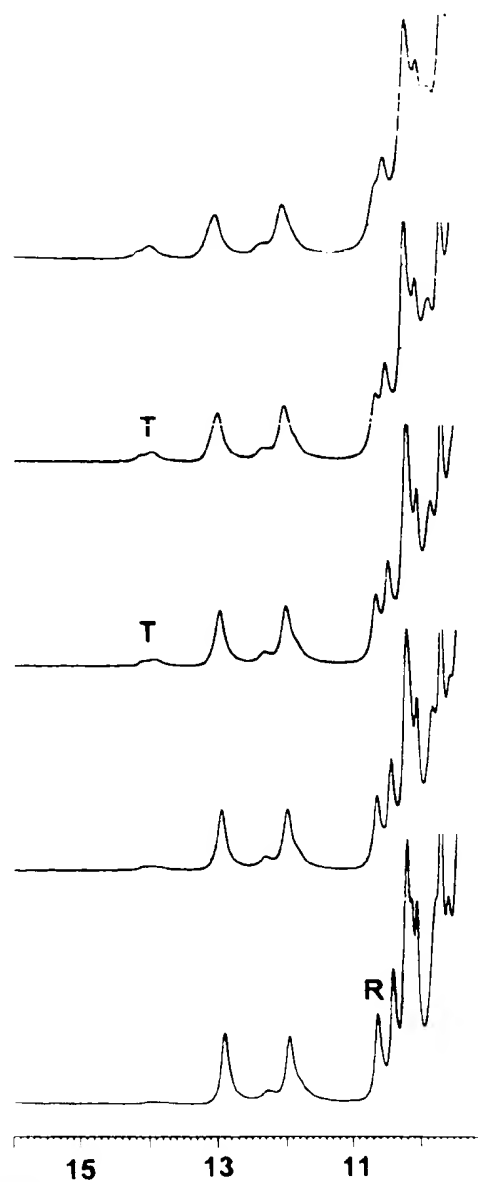


FIG. 8B

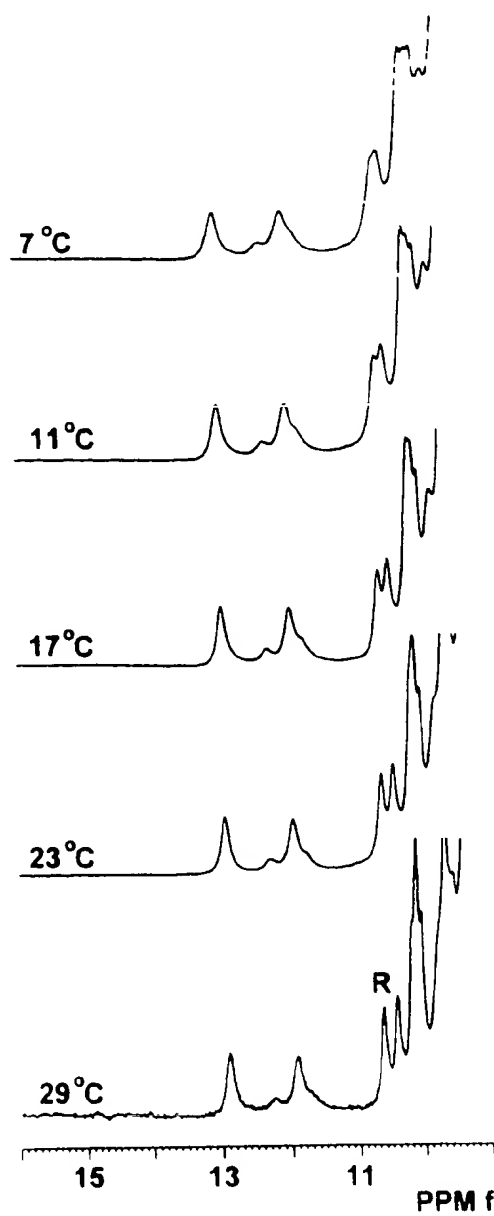


FIG 9A

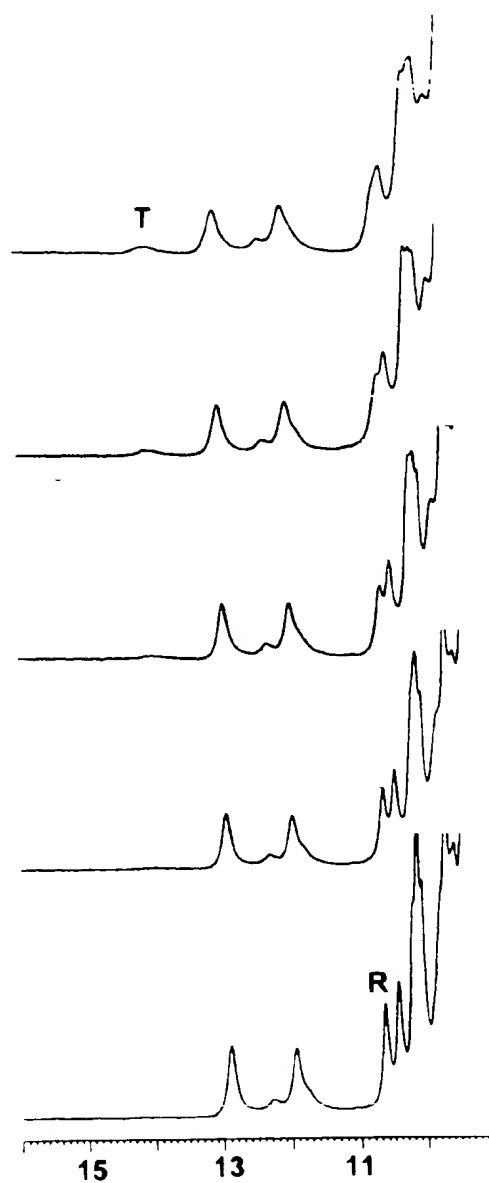


FIG 9B

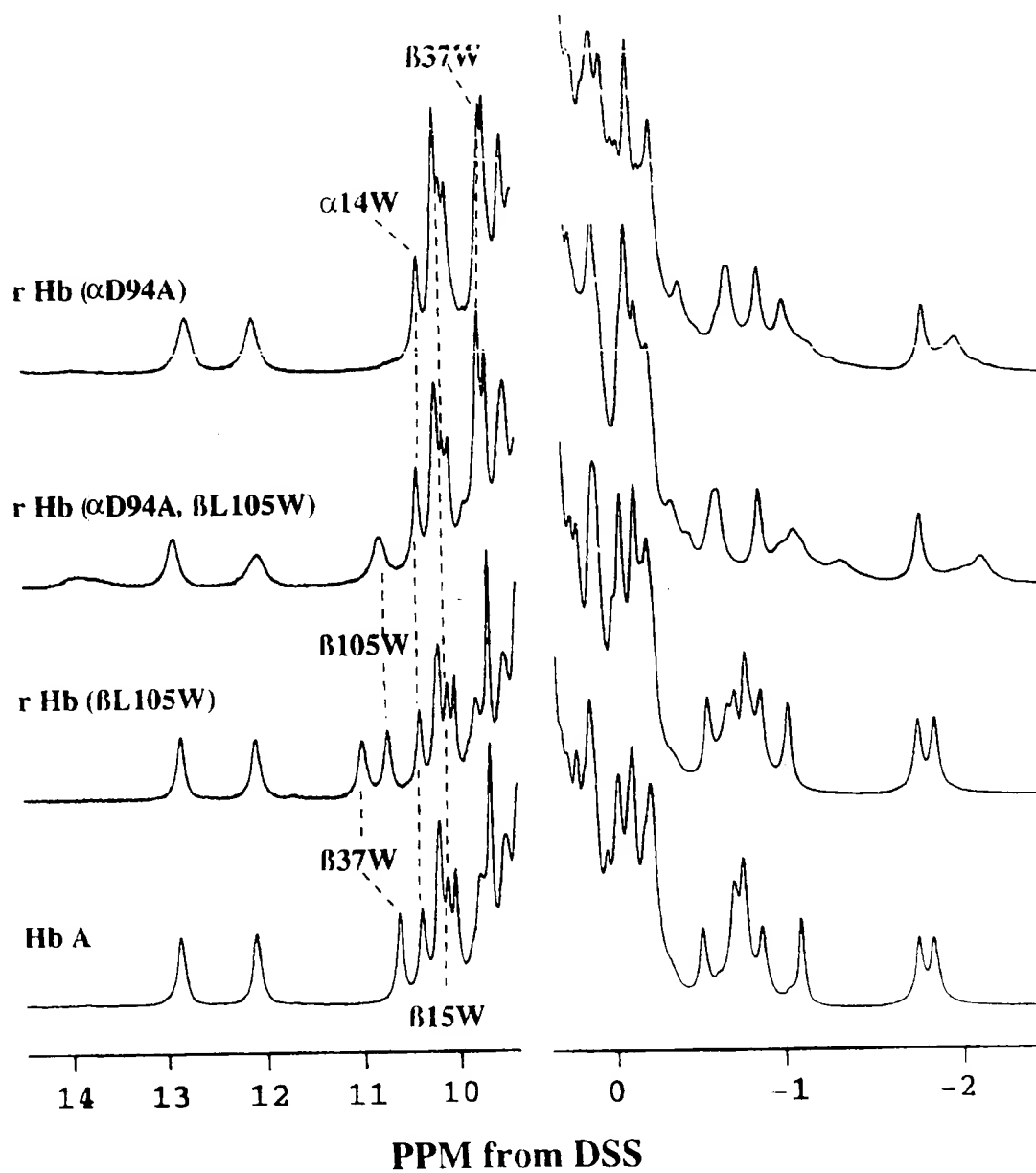


FIG. 10A

FIG. 10B

FIG. 11A

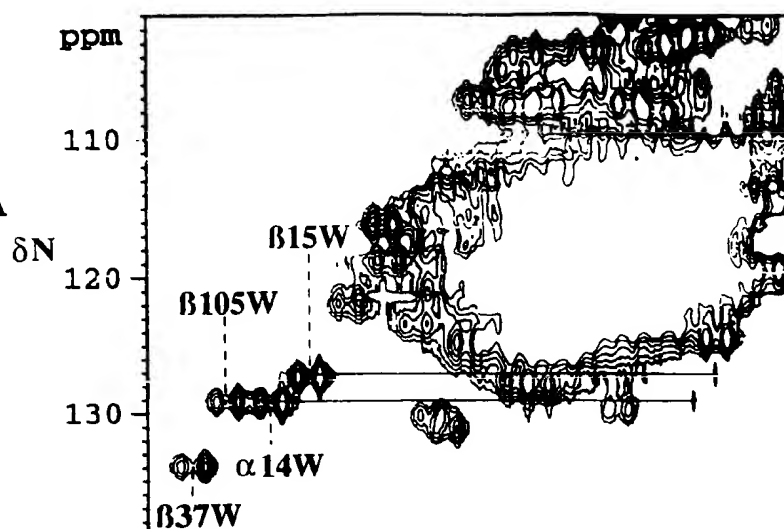


FIG. 11B

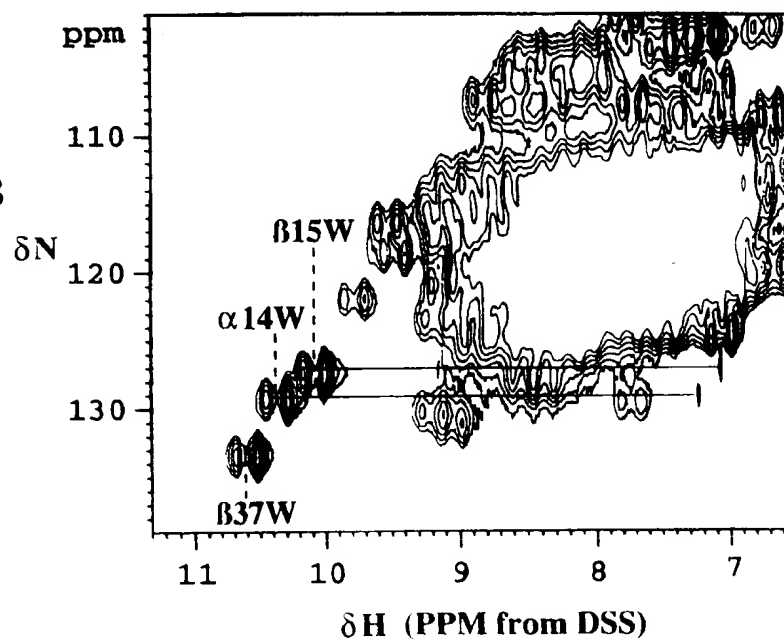


FIG. 12A

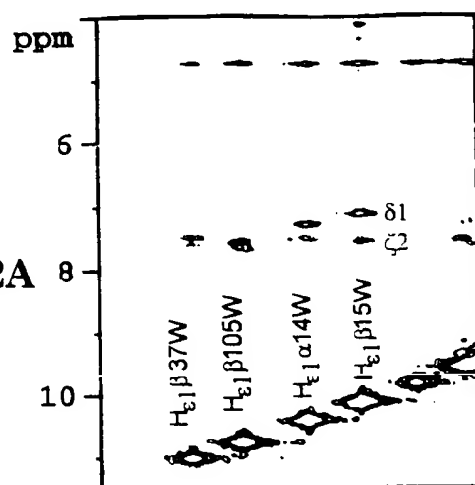


FIG. 12B

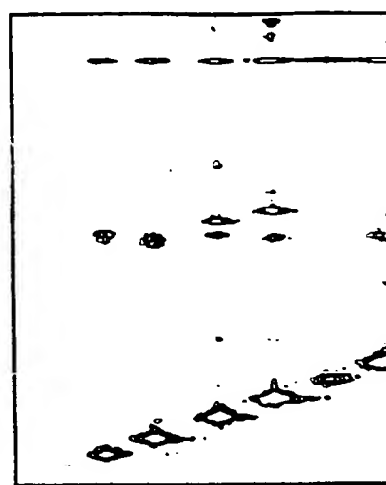


FIG. 12C

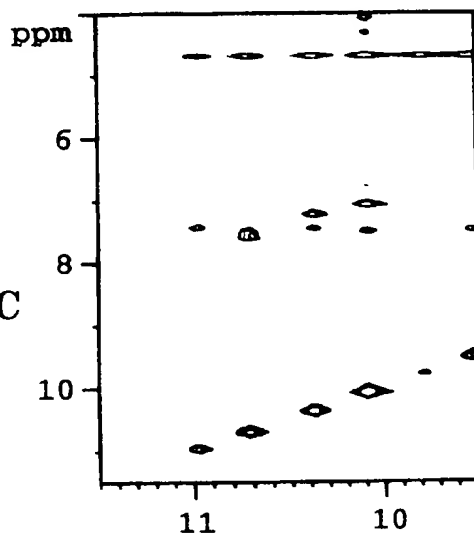
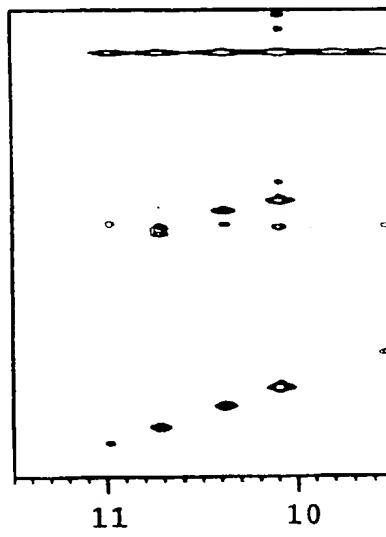


FIG. 12D



PPM from DSS

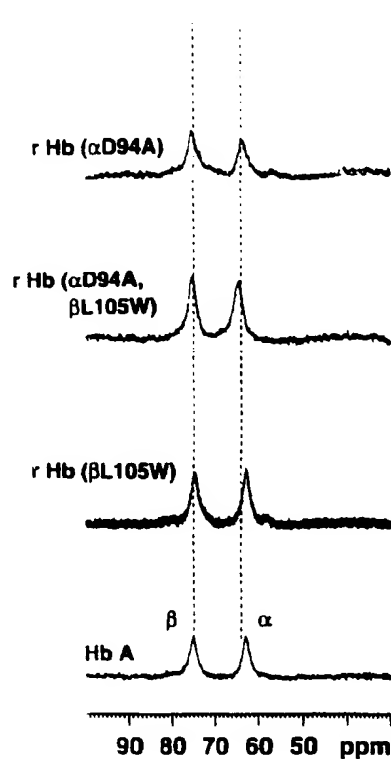


FIG. 13A

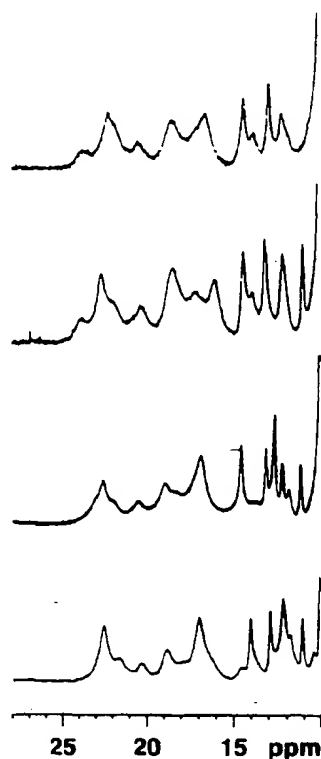


FIG. 13B

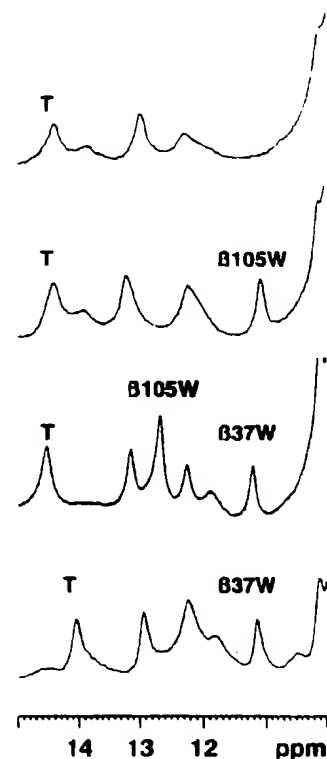


FIG. 13C

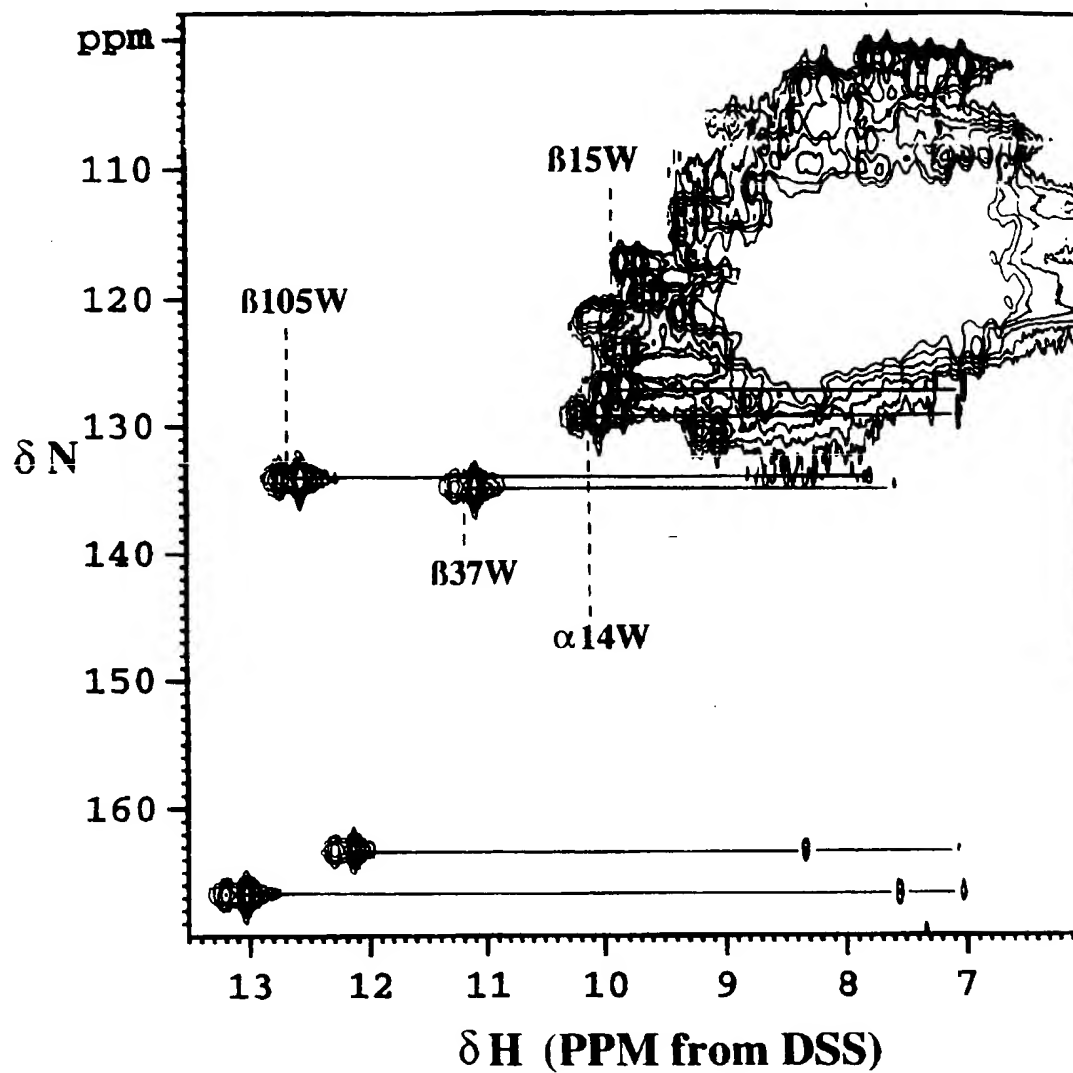


FIG. 14



FIG. 15A

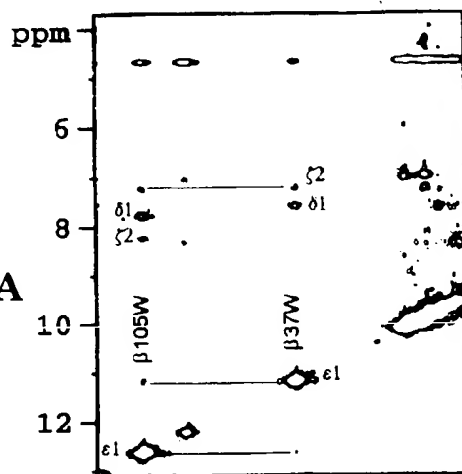


FIG. 15B

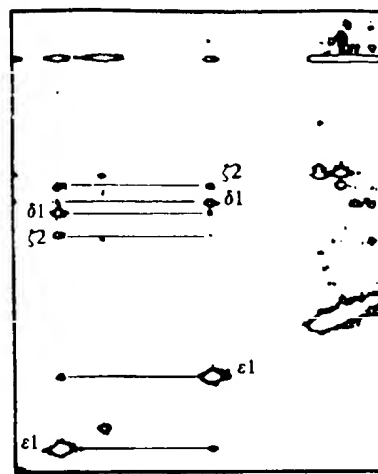


FIG. 15C

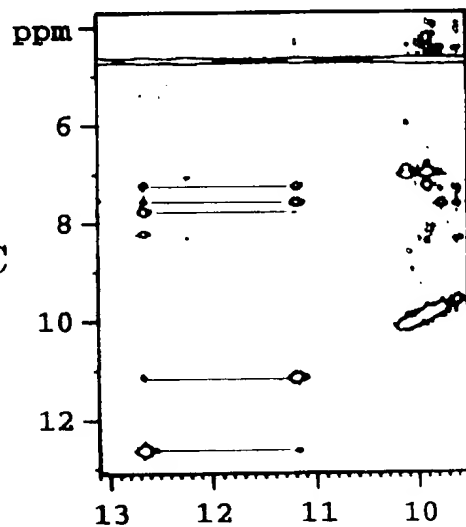
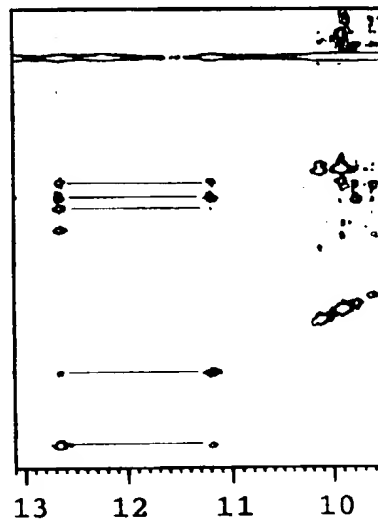
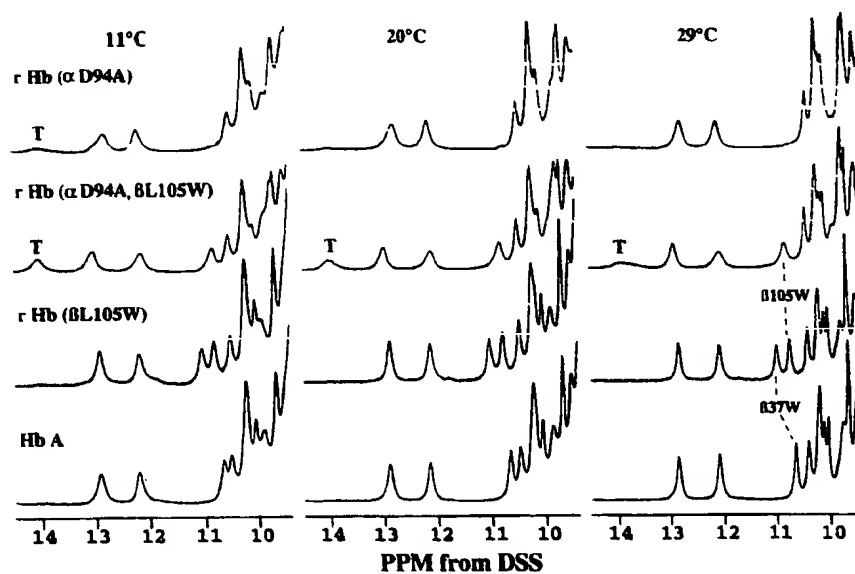


FIG. 15D



PPM from DSS

**FIG. 16 A**



**FIG. 16B**

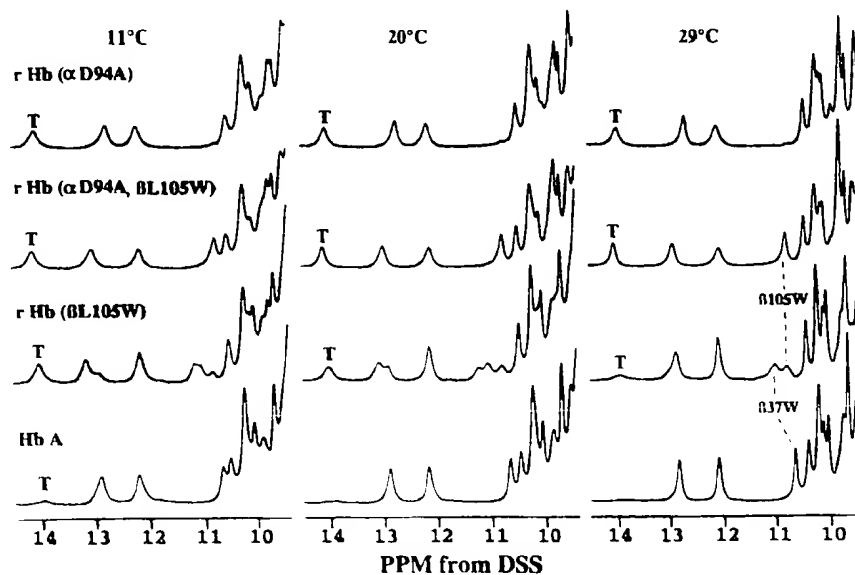


FIG. 17A

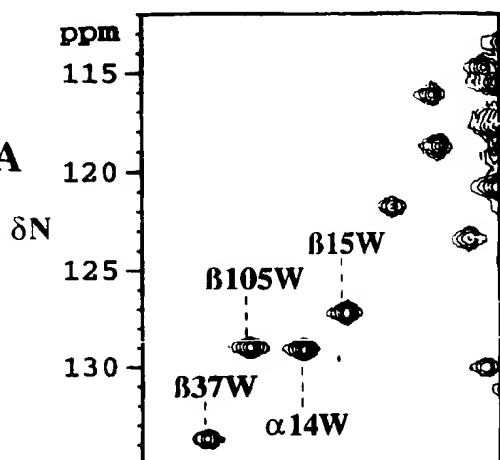


FIG. 17B

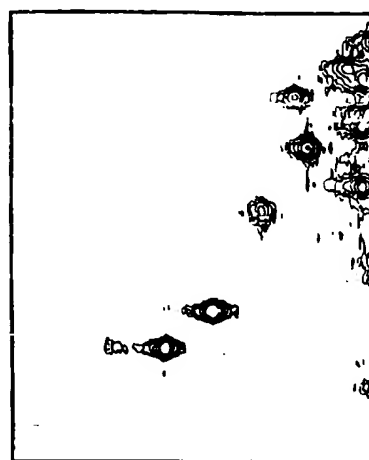


FIG. 17C

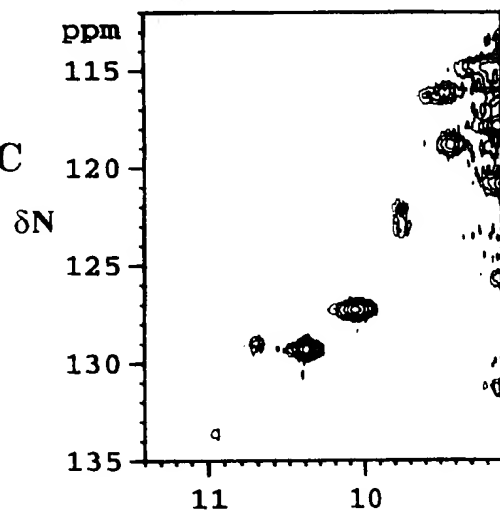
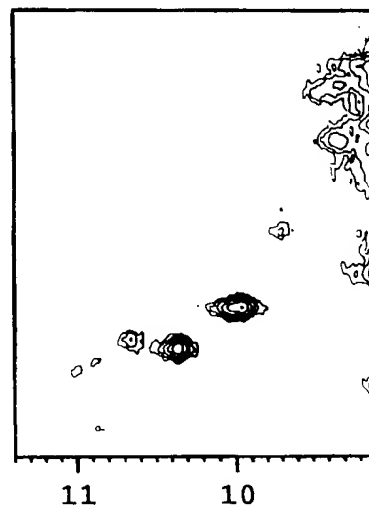


FIG 17D



$\delta H$  (PPM from DSS)

FIG. 18A

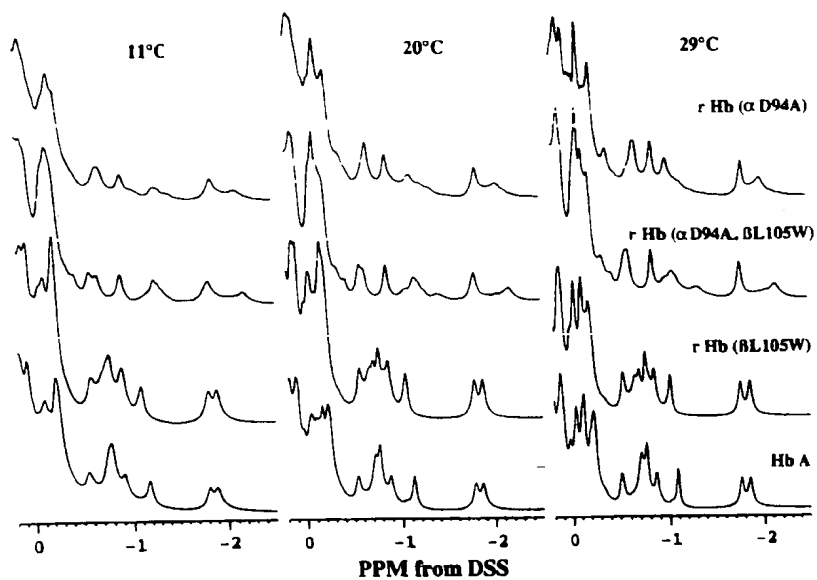


FIG. 18B

